APPENDIX R

Biological Resources and Transportation: Barge Discharge Memo—Operational Confirmation of Avoidance of Marine Floor and Eelgrass (Zostera marina)
Barge Discharge Memo – Operational confirmation of avoidance of marine floor and eelgrass (Zostera marina). Memo to be used for discussion purposes only.

Reference Attached

1. Likely Barge Sketch Drawings.
   a. Sounding performed on August 23rd 2018 at “MLLW (“Mean Low Lower Water”), which is defined per NOAA as “The average of the lower low water height of each tidal day observed over the National Tidal Datum Epoch. In laymen terms, the depths provided on the attached sounding represent the average day lowest tide level observed at the location over a specific 19-year period (1960-1978) adopted by the National Ocean Service as the official time segment over which tide observations are taken.
   b. The Tidal Bench Marks for this survey was taken from Designation “941 8739 C Tidal” located at 40° 44.2’ N, 124° 12.7’ W in King Salmon. A Tidal Bench Mark is local fixed physical object used as a reference to which a tide staff can locally calculate tidal accurate datums (level of sea defined by phase of tide).

The barges utilized to transport wind turbine componentry for the Humboldt Wind Energy Project (project) would be restricted by the max barge crossing limits of the jetty entrance to Humboldt Bay from the open ocean. The largest barge sizes which can enter the jetty and unload at Fields Landing without impacts to the seafloor or eelgrass include the 285’ x 76’ x 18’ and the 340’ x 86’ x 20’ deck barges, or smaller. For purposes of this memo, a 300’ x 84’ x 20’ deck barge would be considered the largest barge that could be used to transport wind turbine componentry and is the base case for this analysis.

To avoid impacts to the seafloor, barges must have enough draft or be positioned in deep enough water during the unloading process. Draft is the depth of the bottom of the barge below the surface of the water. A 300’ x 84’ x 20’ deck barge would draft approximately 2’6” at empty weight (light draft). The max weight this size barge can handle is approximately 7,000 gross tonnage or 14M lbs. At that weight, the barge would draft approximately 15’. Project cargo will “cube” out well before it “weights” out, which
means that the barge would run out of space far before weights came close to the max weight.

For a review of draft at worst case, a barge loaded to max deck capacity of the heaviest piece of cargo, a tower base section at 71,500 KG (157,630 lbs.) was considered. Based on a single stack, no more than 20 base tower sections would fit on the barge at 2 rows of 10 towers. This configuration is also subject to stow plan design, engineering, room for handling, lashing, and other items for full review. If base towers had stacking fixtures available, double stacked in ocean fixtures, the max load quantity would be 40 bases with a weight of 6.3M lbs. Forty bases loaded on a single barge are very unlikely basis logistics supply limitations and this scenario also does not account for the space needed for lifting and lashing. At 6.3M lbs + light draft, the barge would draft 7’1” below surface which is sufficient for discharge at mean low tide. As the barge unloads, it becomes lighter and the draft becomes shallower.

The abandoned pier field (last of the edge of former dock pilings) is 50’ from the stable terminal wall. At mean low tide, the water depth here is 2.5’ (8-10’ at high tide); however 10’ beyond (or 60’ from the terminal wall), the water depth at mean low tide drops to over 10 feet, which is ample depth at low tide for barge discharge without affecting the seafloor.

The safest and most efficient discharge for barge at 60’ from the terminal wall at worse case mean low tide is a shore crane discharge with spud barge / spud leg moorings. The barge would be placed at a proper location based on specific load weight draft and daily tidal forecast to ensure that it does not contact the seafloor during mean low tide. Using steel ropes extending to the shore, the barge will tie up to heavy concrete blocks to keep from drifting away from shore. In the barge channel, a Series S-50 or S-70 model spud barges with cleats, potable spud wells, and spud/morning legs will be used to provide a mooring to prevent the barge from drifting towards the shore. Spud-leg is a method of anchorage better known for securing floating work platforms to their watery bed to prevent general movement and drifting from their work area. Four (4) spud legs would be utilized with an approx. impact of about a square foot per leg for mooring. Each spud barge leg is two-feet in diameter. Spud barges would be temporarily deployed in the deep-water channel to avoid impacting eel grass.

There are many crane types, but for reference, a 600 Ton RT (Rubber Tire Crane) could be deployed at Fields Landing by road without physical concern. This type of crane could be placed at shore, reach and lift 160,000 lbs (slightly heavier than largest piece) 65’ high at 115’ reach. Reach is measured from the center of crane to end of hook. This reach would allow a the crane to access componentry from the front of the barge to the center of the barge. After offloading the first half of the barge, if would be flipped (rotated) for access to the remainder of the cargo.
In a likely operations scenario, loaded barge would begin discharge at high tide, closer to the shore. As the barge becomes lighter from discharge, the draft becomes less, allowing for the barge to remain in place as the tide falls. Specific high and low tide forecasts along with barge load plan would be calculated for placement of barge for that specific daily discharge. If needed, the barge could untie and move out further if tide becoming too low for draft of specific loaded barge.
DECK PLAN

137'8" WIDE INSIDE FENCE

52' STEAM GATE

NO. 5 - PORT
NO. 4 - PORT
NO. 3 - PORT
NO. 2 - PORT
NO. 1 - PORT

52' STEAM GATE

NO. 5 - STARBOARD
NO. 4 - STARBOARD
NO. 3 - STARBOARD
NO. 2 - STARBOARD
NO. 1 - STARBOARD

LENGTH = 283' 0"

30 SPACES @ 8' 0"

30' 0"

5 SPACES @ 6' 0"

30' 0"